

**REMARKS:**

Claims 1-23 are in the case.

Claims 1-11 are presented for consideration.

Claims 12-23 have been withdrawn. Method claims 1-11 were elected with traverse to the extent that the non-elected product claims that further limit any allowable method claims might be rejoined.

**Rejections Under 35 U.S.C. §103(a)**

Claims 1 and 3-10 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Serial No. 5,897,830 to Abkowitz et al. (hereinafter "the '830 patent") in view of U.S. Patent Serial No. 4,772,452 to Brupbacher et al. (hereinafter "the '452 patent").

The Examiner asserts that the '830 patent teaches a method for making a consumable billet by melting and casting a metal matrix composite component having a titanium or titanium alloy matrix reinforced with particles. In Examiner's view, this reads on the method for producing titanium composite parts by means of casting as recited in claim 1.

The '830 patent describes the use of TiC, TiS and TiB<sub>2</sub> as reinforcing particles. The Examiner acknowledges that the '830 patent does not specify that the non-reinforced titanium material is the consumable ingot form, as is recited in claim 1. However, the Examiner asserts that the '452 patent teaches that the metal matrix need not be formed from powdered metal, but may be formed from ingot, scrap etc., rendering claim 1 obvious.

The Examiner essentially states that the sole difference between the method of the '830 patent and the present claim 1 is that, in the '830 patent, the composite piece is obtained through the melting and casting of a titanium or titanium alloy matrix with reinforcing particles of TiC, TiB or TiB<sub>2</sub> in powdered form, while in claim 1, the titanium or

titanium alloy is in the form of an ingot. The Examiner then notes that this feature may be found in the '452 patent.

The Examiner is respectfully requested to consider that the method of the '830 patent comprises the use of a single consumable billet of a consolidated powder having a titanium metal matrix and reinforced particles dispersed therein. That is, the '830 patent comprises as a single starting material an ***already formed composite material*** which is directly melted and cast into a certain shape. In the case of the '830 patent, the percentage of reinforcement material is ***predetermined*** by the percentage of the initial consumable billet.

In contrast, the method of claim 1 comprises ***two starting materials***: On the one hand, a non-reinforced ingot of titanium or titanium alloy and, on the other hand, a titanium composite reinforcement material. Here, the percentage of reinforcement material is not predetermined and, thus, may be adjusted ***at will***.

In addition, it is well known to those having ordinary skill in the art that titanium in the liquid state is highly reactive with oxygen, nitrogen, hydrogen, water and even with the refractory materials used for the manufacture of crucibles. This is the reason why the melting processes of titanium are carried out under vacuum in a controlled atmosphere, as opposed to the conventional melting of other metals, such as Al, Fe, Cu etc., which does not require special conditions.

It is also well known to those having ordinary skill in the art that a titanium composite material is much more reactive than non-reinforced titanium. Thus, when one directly melts a titanium composite material, as in the '830 patent, the "skull" (the material first contacting with the refrigerated crucible), being made of a titanium composite, reacts and shows many defects and problems in the final product.

These problems are solved by the method of claim 1, which comprises simultaneous melting of non-reinforced titanium or titanium alloy ingot and a

reinforced composite of titanium (highly concentrated). Since the titanium or titanium alloy has a lower melting point than the reinforced composite material, the non-reinforced material starts melting before the reinforced composite material. Thus, the first material contacting the crucible, i.e. the material forming the skull, will be a non-reinforced titanium material, so that no reactivity problems will arise. Once the skull is formed, the rest of the ingot and the reinforced material will also start melting. By means of the method of claim 1, it is possible to obtain molded composite pieces without any reactivity problems. This was not possible prior to the method according to the present invention.

Furthermore, the '452 patent relates to the preparation of metal second-phase composite materials (i.e., the subject matter of the '452 patent belongs to a different technical field). Therefore, a person having ordinary skill in the art to which the present invention pertains would not be prompted to apply the teachings of the '452 patent to the teachings of the '830 patent to arrive at the invention claimed in claim 1.

It is noted that the Office Action does not explain why or how a skilled artisan would combine the teachings of the '830 patent and the '452 patent to arrive at the invention claimed in claim 1. A person having ordinary skill in the art would not be prompted to combine the teaching of the '830 patent and the '452 patent, especially taking into account the already-expressed differences between the method of the '830 patent and the method claimed in claim 1.

Thus, it is therefore respectfully submitted that claim 1 is patentable over the '830 patent in view of the '452 patent.

Since claims 3-10 depend from claim 1, and thus contain all the elements of claim 1, it is respectfully submitted that claims 3-10 are patentable over the '830 patent in view of the '452 patent for the reasons provided above.

Additionally, claim 2 has been rejected under 35 U.S.C. §103(a) as being unpatentable over the '830 patent in view of the '452 patent and further in view of U.S.

Patent Serial No. 4,836,982 to Brupbacher et al (hereinafter "the '982 patent").

Since claim 2 depends from claim 1, and thus contains all the elements of claim 1, it is respectfully submitted that claim 2 is patentable over the '830 patent in view of the '452 patent and further in view of the '982 patent for the reasons provided above.

Finally, claim 11 has been rejected under 35 U.S.C. §103(a) as being unpatentable over the '830 patent in view of the '452 patent, and further in view of U.S. Patent Serial No. 6,755,239 to Ray et al. (hereinafter "the '239 patent").

Since claim 11 depends from claim 1, and thus contains all the elements of claim 1, it is respectfully submitted that claim 11 is patentable over the '830 patent in view of the '452 patent, and further in view the '239 patent for the reasons provided above.

### **Conclusion**

Accordingly, the Applicants believe that claims 1-11 are in condition for allowance and favorable action is respectfully requested. No new matter has been added. Should there be any issues that have not been addressed to the Examiner's satisfaction, Applicants invite the Examiner to contact the undersigned attorney.

If any fees are due in connection with this response, please charge such fees to Deposit Account No. 14-1431.

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